1015. Strong and weak solutions of potassa being employed in the tubes, then the single metals zinc, lead, copper, tin, and cadmium (969) will produce a similar battery.

1016. If the arrangements be as in fig. 76, in which the vessels ; *3) 5)* etc. contain strong sulphuric acid, and the vessels 2, 4, 6, etc. dilute.sulphuric acid; and if the metals a, a, *a* are tin, and *b, b, b* are iron (967), a battery electric current will be produced in the direction of the arrow. If the metals be changed for each other, the acids remaining; or the acids be changed, the metals remaining; the direction of the current will be reversed.

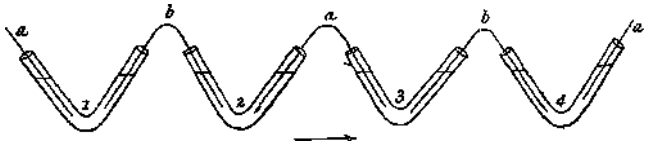

Fig. 76.

^ viii. *Considerations of the Sufficiency of Chemical Action*

1017. Thus there is no want of cases in which chemical action alone produces voltaic currents (1005); and if we proceed to look more closely to the correspondence which ought to exist between the chemical action and the current produced, we find that the further we trace it the more exact it becomes; in illustration of which the following cases will suffice.

1018. *Chemical action does evolve electricity.*—This has been abundantly proved by Becquerel and De la Rive. Becquerel's beautiful voltaic arrangement of acid and alkali[1] is a most satisfactory proof that chemical action is abundantly sufficient to produce electric phenomena. A great number of the results described in the present papers prove the same statement.

1019. *Where chemical action has been, but diminishes or ceases, the electric current diminishes or ceases also.*—The cases of tin (870, 872), lead (873), bismuth (883), and cadmium (893), in the solution of sulphuret of potassium, are excellent instances of the truth of this proposition.

1020. If a piece of grain tin be put into strong nitric acid, it will generally exert no action, in consequence of the film of

[1] *Annales de Chimie,* 1827, **xxxv.** p. *122. Biblioth&que Universelle,* 1838, xiv. 129, 171.